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RADIO KITS

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MK 484 TRF Receiver

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Book of Radio Kits

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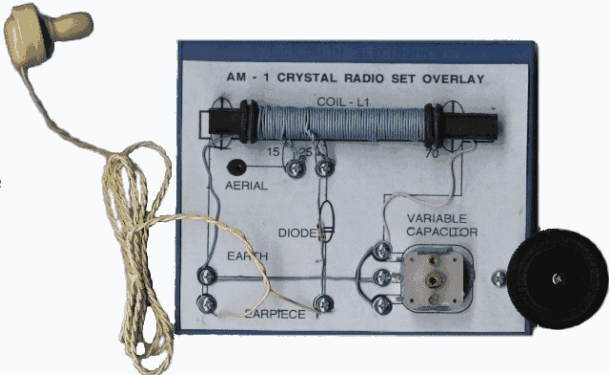
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Fun with Radio and Electronics!

Print out this page and have a go at building a crystal radio set yourself!*

INTRODUCTION

If you're stuck inside on a Saturday afternoon with a junk box full of electronic parts and nothing much to do, you can spend an hour or so and build this very simple but effective Crystal Radio receiver. Often, the satisfaction of building these simple radios is lost amidst the latest computer program or the latest digital marvel chip!



THEORY

Briefly, a Crystal Radio receiver derives its energy from the radiated power from the AM radio stations in your area. This energy travels in waves, and is induced into your Aerial/Earth wire system (more about safe Aerial and Earth wires later on) and then fed into the coil/capacitor circuit. This coil/capacitor combination is known as a "tank" circuit, because it stores radiated energy. The coil stores this energy in a pulsating electromagnetic field, while the variable capacitor stores energy in an electro-static field between its fixed and moving sets of plates.

The Ferrite Rod acts as a bar magnet for radio waves, concentrating them inside the turns of the coil. When you turn the knob of the variable capacitor you change the value of this device. Changing the value of the capacitor will vary the frequency at which the Crystal Radio receives. When you tune into a local AM radio station, the tank circuit experiences what is called "resonance". This is like a musician using a tuning fork to tune up the strings of his instrument. Each string will "resonate" with the chosen tuning fork when they are both pitched at the same frequency.

In the same way, when a radio station and the Crystal Radio are tuned into the same frequency, resonance takes place. This state of resonance allows for maximum signal transfer between transmitter and receiver. The selected frequency is then fed into the Germanium Diode detector. This component separates (rectifies) the radio station's "carrier wave" from the program signal (voice and music). The rectified signal is then fed into the Crystal Earpiece where it is converted into sound waves that we can hear.

OVERLAY FOR CRYSTAL SET		Parts List Dick Smith Electronics	
(Refer to printable document for accuracy)		Ferrite Rod	R5107
		Diode OA91	Z3040
		VC1 220pf	R2970
		Earpiece	C2765
		Coil wire (3m)	W2123
		Aeria/Earth wire	W2260
		8 x screws	H1634
		8 x washer	H1488
		1 x b'board	H4050

CONSTRUCTION

Our radio set can be made up on a square of wood or plastic around 10cm by 12cm by 1cm. If you or a parent can solder, then feel free to drive nickel plated nails into the wooden baseboard. Then you can "tin" these with a bit of solder and use each nail head as a tie point to interconnect the component leads. **BE VERY CAREFUL** with soldering tools - wear eye safety glasses at all times. Alternatively, you can use a screw/washer combination with the DSE plastic baseboard. These should be the #4x9mm screws and the washers around 5mm in diameter (see parts list). If you decide to solder, take special care with soldering the Diode and the solder tags from the Variable Capacitor. The Diode should only be soldered by using a heat sink (a simple device that will draw any excess heat away from the Diode itself) and this can be a crocodile clip attached to either end of the Diode's leadouts (close to the glass bulb) during soldering. The casing of the Variable Capacitor is made of plastic, and any excessive heat applied during soldering may well melt a part of this fragile case.

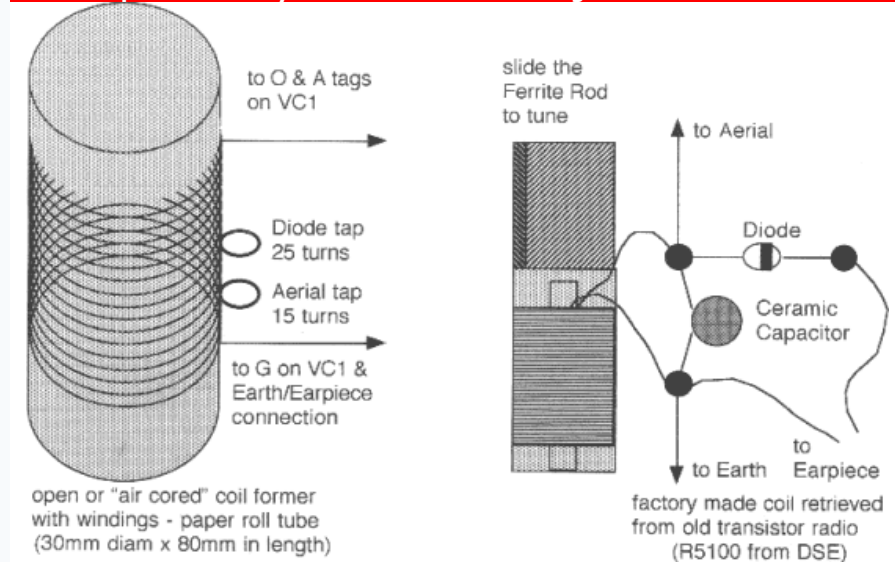
You can use other coils in this simple Crystal Radio design. You can either wind an air-cored coil (if you can't get hold of a Ferrite Rod easily) as shown below (comprised of the same number of

turns -70) wound on a paper roll tube complete with taps (at 15 turns and 25 turns) or you can retrieve a factory made coil from an old, disused transistor radio. This coil actually has two windings, and you can tune the Crystal Radio by wiring a 120pF capacitor (instead of the variable capacitor) across the main winding (usually 'white and black wires') and sliding the square Ferrite Rod up and down inside the coil former to tune in local stations (see diagram below).

AERIALS AND EARTHS

The best Aerial is one that is at least two metres high off the ground (higher if possible) and at least ten metres long. You **MUST** stay well clear of overhead power and telephone cables for safety's sake. The safest Earth wire is one that's connected to a cold water pipe that is embedded in moist soil. A garden tap fitting just outside a window is ideal. Do **NOT** use the earth pin of a 240 volt power outlet, nor a hot water pipe, nor a gas pipe, as **these are all unsafe** to use as Earth connections, and may well result in electrical shocks or explosions occurring.

DO NOT operate this Crystal Radio receiver during an electrical thunderstorm.



design by **the manikin**

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